WHAT IS CLAIMED IS:

1. A semiconductor wafer processing system, comprising:

a reactor for processing at least one semiconductor wafer;

at least one load lock coupled to the reactor; and

a magnetically coupled linear servo-drive mechanism located within the at least one load lock to transfer wafers to and from the reactor, the servo-drive mechanism including

a carriage for holding a wafer;

a driven magnet array within the carriage;

a guiding mechanism for guiding the carriage linearly,

a cylindrical tube housing a linear actuator and isolating the actuator from a wafer environment in the load lock, the driving magnet array inside the cylindrical tube and mounted to an output of the linear actuator, the driving magnet array magnetically coupled to the driven magnet array mounted within the carriage;

an engine coupled to the actuator to drive the actuator, and

a controller coupled to the engine to control the engine for optimizing transfer times and controlling acceleration.

2. The system of claim 1, wherein the reactor uses chemical vapor deposition.

3. The system of claim 1, wherein the first magnet array includes

permanent magnets that are radially aligned within the carriage and have alternating polarities.

4. The system of claim 3, wherein the actuator comprises:

a shaft coupled to a pulley system, the pulley system coupled to the engine; and

a nut coupled to a second magnet array, the second magnet array includes permanent magnets arranged radially and having alternating polarities, the nut coupled to the shaft such that the nut moves axially along the length of the shaft when the shaft rotates.

5. The system of claim 4, wherein the first magnet array includes at least two magnets having opposite polarities.

6. The system of claim 5, wherein the second magnet array has the same number of magnets as the first magnet array.

7. The system of claim 1, wherein the guiding mechanism includes a linear ball slide.

8. The system of claim 1, wherein the cylinder is non-magnetic.

9. The system of claim 1, wherein the shaft is a ball screw shaft.

10. A magnetically coupled linear servo-drive mechanism for use in a load lock of a semiconductor fabrication system, comprising:

a carriage;

a guiding mechanism for guiding the carriage linearly;

a cylinder housing an actuator, the actuator magnetically coupled to the carriage;

an engine coupled to the actuator to drive the actuator; and

a controller coupled to the engine to control the engine for optimizing transfer times and controlling acceleration.

11. The magnetically coupled linear servo-drive mechanism of claim 10, wherein the carriage includes a first magnet array.

12. The magnetically coupled linear servo-drive mechanism of claim 11, wherein the first magnet array includes permanent magnets that are radially aligned within the carriage and have alternating polarities.

13. The magnetically coupled linear servo-drive mechanism of claim 12, wherein the actuator comprises:

a shaft coupled to a pulley system, the pulley system coupled to the engine;

a nut coupled to a second magnet array, the second magnet array

includes permanent magnets arranged radially and having alternating polarities, the nut coupled to the shaft such that the nut moves axially along the length of the shaft when the shaft rotates.

14. The magnetically coupled linear servo-drive mechanism of claim 13, wherein the first magnet array includes at least two magnets having opposite polarities.

15. The magnetically coupled linear servo-drive mechanism of claim 14, wherein the second magnet array has the same number of magnets as the first magnet array.

16. The magnetically coupled linear servo-drive mechanism of claim 10, wherein the guiding mechanism includes two guide shafts.

17. The magnetically coupled linear servo-drive mechanism of claim 10, wherein the cylinder is non-magnetic.

18. The magnetically coupled linear servo-drive mechanism of claim 10, wherein the shaft is a ball screw shaft.

19. The magnetically coupled linear servo-drive mechanism of claim 13, further comprising a four-axis gimbal between the nut and the

second magnet array.

20. A method for linearly translating a wafer in a semiconductor wafer fabrication system, comprising:

placing a wafer on a carriage;

magnetically coupling an actuator to the carriage, the actuator isolated from a vacuum environment; and

translating the actuator linearly with controlled acceleration, which in turn translates the carriage, holding the wafer, linearly due to the magnetic coupling.

21. The method of claim 20, wherein the translating includes optimized motion.

22. A device for linearly translating a wafer in a semiconductor wafer fabrication system, comprising:

means for placing a wafer on a carriage;

means for magnetically coupling an actuator to the carriage, the actuator isolated from a vacuum environment; and

means for translating the actuator linearly, which in turn translates the carriage, holding the wafer, linearly due to the magnetic coupling.